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THE DIVISION INSECT MUSEUM AS A TOOL IN THE FOREST INSECT RESEARCH PROGRAM

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and G. M. Thomas, Entomologists

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Pacific Northwest
Forest and Range Experiment Station

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I. INTRODUCTION

The insect museum is an important tool of insect research. It provides researchers with fundamental biological information on insects of current importance and insects which may become important in the future.

Continuous collecting and filing of information is necessary to maintain an efficient museum. The responsibility for expediting these activities at the PNW Forest Exp. Station has been delegated by the Division Chief to an appointive group, known as the Insect Collections and Facilities Committee. This Committee has reviewed the scope of activities related to the insect museum, assessed needed improvements, and recommended methods of fulfilling the major needs. The information outlined in this report is to assist in the formulation of a Division policy statement on the handling of museum material.

II. SCOPE OF THE DIVISION INSECT MUSEUM

A. Components.

The insect museum consists of a collection of preserved insects, examples of insect damage to trees and forest products, and the Hopkins U. S. file system. These three components supplement each other to provide a reservoir of information on forest insects of current and potential economic importance in the Pacific Northwest.

1. The insect collection consists of three parts: adult insect specimens, preserved dry on pins; immature forms of insects and extra adult specimens preserved in alcohol; immature forms, adult insects of small size, and morphological structures mounted on microscope slides.

2. Examples of insect damage consist mainly of work samples showing galleries of specific bark beetles and wood-boring insects, and Riker mounts showing feeding injury by insects to foliage and fruits of forest trees.

3. The Hopkins U. S. file is a numerical system for correlating biological data and observations with specimens in the insect collection and with examples of damage. Forest insect species are catalogued as to their presence by an alphabetically-arranged species file, and by the host from which species have been recovered.

1/ Submitted as a report of the Insect Collections and Facilities Committee by V. M. Carolin, Chairman, W. K. Coulter, P. W. Orr, and G. M. Thomas. January 1957.

B. Uses.

1. Reference material is provided in the form of insect specimens and samples of typical damage, in order to permit rapid identification of insects collected during the work program or submitted with a general request for information.

2. Through the Hopkins U. S. file system, a continuous summary is available for the information accumulated on a forest insect, its parasites, predators, and associated fauna, often prior to the appearance of the insect as a factor of serious economic importance.

3. Members of the staff receive valuable training in methods of processing insect material to obtain reliable identifications associated with reliable biological information.

III. MAJOR NEEDS TO IMPROVE THE VALUE OF THE INSECT COLLECTION

A. Promotion of an orderly flow of currently collected insect material into the museum as rapidly as possible.

B. Processing of the backlog of insect material accumulated during years when time and space were not available for complete processing.

C. Improvement in the caliber of biological information associated with specimens, by increased attention and care to rearings and to preparation of records of insect stages and damage.

D. Improvement in the condition of reference materials, by better techniques in rearing and mounting specimens, and in preparing work samples.

IV. MEANS AND METHODS OF FULFILLING MAJOR NEEDS

A. Personnel involved and responsibilities.

1. All members of the staff - collect and cage material for rearing; to be responsible for recording and separating insect species obtained; to prepare or oversee the preparation of samples of damage and photographs of insects and damage; to prepare rough-draft notes for the numerical section of the Hopkins file; to mount and label insects submitted for Hopkins records.

2. Biological Aid - to make isolations of specimens from rearings at a central place according to instructions; to make entries on prescribed forms; to assist in the preparation of work samples; to mount and label insect specimens under direct supervision; and to perform related tasks, such as construction of insect cages and actual handling of insect material, according to the limits of his ability.

3. Division Chief - to appoint an Insect Collection Committee, to provide for the employment of a Biological Aid during the field season and at other times as needed; to determine policy in maintenance of the insect museum.

4. Insect Collection Committee - to accomplish the final processing of preserved and isolated insect material for which individual responsibility cannot be assigned. Routine responsibilities include final labelling of such material, transmittal of specimens from all appropriate rearings to authorities for determination, incorporation of identified specimens into the collection and preparation of entries for the host and species sections of the file. Special responsibilities are the determination of priorities on processing and methods of improving efficiency in the maintenance procedure, and preparation of recommendations on policy.

5. Section of Insect Identification A.R.S., Washington - to provide accurate determinations of insect specimens properly submitted, within a reasonable length of time; to provide specific information on insect species or groups of insect species so requested.

B. Facilities Required.

1. Space at a central location must be devoted to rearings and initial processing of insect material: i.e., insectary facilities, including facilities for photography.

2. Office space must be available for processed insect material, files, and insect collection activities.

3. Specific facilities needed in the office, and to a varying degree in the insectary include: cabinet space with pinning trays for adult insects; file drawer space (5" x 8") for insects in alcohol; file drawer space (3" x 5") for the sections of the Hopkins U. S. file; cabinet space with drawers for specimens of damage to bark and wood, and Riker mounts to show foliage injury and for display of insect life stages; cabinet space for insects mounted on slides; cabinet space with shelves for partially processed insect material; table space for relaxing jars; book-case-type compartments for Schmitt Boxes; work space in the form of table tops with storage space for mounting materials in drawers; printing press to prepare insect labels.

C. Methods

1. Establishment of Priorities.

a. Sequence of processing - Current rearings should have first priority for incorporation of insect specimens into the collection and entry of records into the Hopkins U. S. file. Backlog material will be processed at intervals according to the value and adequacy of the rearings. In some cases, it is advisable to re-collect host material rather than to attempt to reconstruct incomplete notes and rearings, particularly where specimens are missing. Among current rearings, project rearings designed for Hopkins records will have top priority in final processing. Rearings from hosts or localities not previously collected will have second priority.

b. Representation of material - Needs will be determined on a long term basis. Special effort should be made to obtain representation of both sexes of a species, of ecological groups, and of common orders normally neglected because of difficulties in rearing (i.e., Diptera). Records of rearings of important or common forest insects should be checked for adequacy of specimens and biological information, and for validity and completeness of determinations. Gaps should be filled by intensive rearings at pertinent stages of development. Insects on unusual hosts, particularly woody range plants, shrubs of importance to wildlife, and low value tree species, should be collected whenever the opportunity exists.

c. Space assignments - Space priorities in the collection for insect orders and families should be approximately determined. Ordinarily, space should allow a single species to be represented by 4 to 8 pinned specimens from each Hopkins U. S. number lot. Numbers of specimens of a single species should not become excessive. Excess specimens of a species should be offered to the Section of Insect Identification, or educational institutions.

2. Scheduling work on the insect collection.

a. Project material - Such material designed for incorporation into the collection should be organized by project leaders for final processing, shortly after the end of the field season. Other material should be processed next.

b. Material scheduled for final processing - By conference between a member of the Insect Collection Committee and a project leader or collector, decisions will be reached as to number of mounted specimens desired for the collection including those to Washington for determination, detail of notes, and Hopkins U. S. number to be assigned to each lot collected.

Material processed to the extent of the collector's responsibility will be placed in the appropriate cabinet in the insect collection room for completion of processing by the Insect Collection Committee. A tentative schedule will be set up by the Committee to process the material visible in the cabinet. Many times, such work will be done as opportunity permits. When the partially processed material in sight becomes reduced to the point where accomplishment is evident, further material will be obtained from current rearings or the backlog, and a new tentative schedule set up.

c. Transmittal of material for determination - Once sufficient material is processed to justify transmittal of specimens to Washington (preferably grouped by order of insects), packaging of material for shipment, final draft of the file cards for the numerical series, and preparation of identification cards and transmittal forms should be given top priority in the division schedule. From time to time, small lots needing immediate determination will be sent to Washington or to specialists elsewhere.

d. Receipt of determinations - When determinations of insect material arrive from Washington, the completion of the Division copy of the identification cards, the placement of specimens into the collection, and the completion of indexing to include the host and species files must be accomplished immediately by a member of the Insect Collection Committee.

3. Organization of rearings for proper handling with maximum efficiency. (Refer to "Instructions for Handling Insect Material at Sellwood").

V. GENERAL PRINCIPLES AFFECTING FULFILLMENT OF MAJOR NEEDS.

A. Microscopic examination for specific characters must be used to separate species obtained from a rearing. The original separation of species, even though no actual identification is sought, should be accomplished to the best of the staff's ability, before specimens are sent to Washington.

B. The importance of correct and complete labels cannot be over-emphasized. If a parasite or predator and its proper host can be definitely related, this information should appear on the labels and in the rearing notes. If not, the apparent relationship should be considered as an association. Specimens to be placed in the alcohol collection should be labelled with the same care and thoroughness as bestowed upon pinned specimens.

C. If a project rearing is not involved, the cards in the Hopkins U. S. number file should contain as complete information as possible on the insects reared and the hosts supporting these insects.

D. Insect specimens mounted for the collection and for identification in Washington should be in near perfect condition to permit subsequent identification.

E. All members of the staff should discharge their respective duties regarding the processing of insect material, so that no great burden will fall on any one person.